CHAPTER V

TOOL DESIGN AND METHODOLOGY FOR ITS USE

5.0 Introduction

As a strategy to cope up with the new requirements of becoming competitive globally, organizations have been embracing TQM philosophy world over. TQM is the most appropriate strategy for the Indian industries because quality is one of the critical features for competing in the world market. TQM has two sides, one side comprises of tools, techniques and systems called the hard side and the other, the soft side that is the people side where new attitudes and behaviors are called for. TQM aims at bringing in significant changes in the people side of the organization. In this chapter, the research problem and the research methodology employed for assessing HRQ have been discussed.

5.1 Problem

TQM requires the involvement of every one, particularly of the employees (HR) of the organization. For involvement of employees they need to be trained in the concepts, tools and instructed on their role in the TQM movement. They need to be empowered to bring improvements in the process they carry out and then recognized for having done the right thing. TQM practices in an organization aimed at achieving the above bring about significant changes in human resource. Although there are many approaches to assess the accountability of HR function, making use of a variety of tools and assumptions, HR departments still have difficulty in achieving success with current approaches. (Different approaches for measurements of human resource have been discussed in chapter III) Unfortunately, there are only a few success stories about a comprehensive HR evaluation program. Many researchers question the quantitative approach to evaluation, suggesting that a return on investment in employees must be approached cautiously and judicially and that any such return may be the result of activities of the employees. The literature survey conducted has not been able to identify a comprehensive method to assess
human resource quality in the organization. As has already been discussed in the earlier section, TQM aims at people who are committed, flexible, willing and able to work in teams in a cooperative manner. Organization wide training and development programs are undertaken while implementing TQM practices to ensure cultural and attitudinal changes in human resource. The measurement approaches mentioned in the literature survey mainly aims at assessing the impact of HR function on business performance. Further, there is a widespread disagreement on these approaches. Hence, it is abundantly clear that there is a need for the development of an instrument to measure the human resource quality. Such an instrument incorporating the indicators of Human Resource Quality (HRQ) would definitely be able to assess the changes in quality of human resource due to efforts of TQM. In this research, an instrument for assessing the human resource quality has been designed and developed, and this instrument has been used to measure the impact of TQM efforts on HRQ. TQM efforts conclusively contribute to the changes in the soft side leading to changes in human resource quality (HRQ). Much of TQM research has been highlighting the success stories and positive impacts. Further, the data has been collected in these researches mainly through interviews of the top people and are based on documented interventions in the organizations. In this study, the investigator has taken a totally different approach and attempted to assess the perceptions of the employees of the organization on the different indicators of HRQ.

5.2 Objectives of the Research

This thesis has been titled as "Development of an Instrument to Assess Human Resource Quality (HRQ) and measuring the Impact of TQM efforts on HRQ using the Instrument". The major objective of the research is to develop an instrument to assess HRQ. The findings from the study will yield right insights of the different dimensions of human quality and methods to improve the same. The study undertaken by the researcher can make substantial contribution to understand the level of each indicator of human resource quality and thus identify dimensions on which the organization has to concentrate to enhance HRQ.
1) To design and develop an instrument for assessing Human Resource Quality in different organizations and to find out the Human Resource Quality Index (HRQI).

2) To critically evaluate and assess the changes in organizational culture consequent on the implementation of TQM practices in selected organizations using the instrument.

3) To find out the impact of TQM practices in the quality of work life in selected organization.

4) To assess the impact of TQM efforts on employee satisfaction in selected organizations.

5) To assess the changes in HRQI in a few selected organizations.

5.3 Research Methodology

Total quality forum of USA defines TQM as “TQM is a people focused management system that aims at continual increases in customer satisfaction at continuously lower cost. TQM is a total systems approach (not a separate area or program) and an integral part of high level strategy. It works horizontally across functions and department involving all employees, top to bottom and exceeds backwards and forward to include the supply chain and the customer chain”. Thus TQM is a people focused management system. TQM approach to quality emphasizes three areas of quality,

a) Product quality
b) Process quality
c) Human quality

Implementation of TQM practices leads to tangible and intangible benefits. Tangible benefits such as improvement in quality of products and service, higher productivity, lower cost, better house-keeping, reduction in waste, improved safety and increase in profitability are bound to occur. The impacts of TQM on human quality in terms of intangible benefits are as follows

a) Enrichment of quality of work life
b) Attitudinal changes
c) Better harmony
d) Better communication
e) Effective team working
f) Better human relations/trust
g) Participative culture
h) enhanced job knowledge
i) greater sense of belonging
j) sense of achievement and recognition
k) challenging work
l) greater responsibility
m) self esteem and satisfaction
n) change in mind set and self development

Critical analysis on the impact of TQM on HRQ leading to changes as listed above highlights the need for development of an instrument to assess HRQ periodically and systematically. Literature survey, expert opinion and logical reasoning have enabled us to identify the variables of human resource quality. They are mainly organizational culture, quality of work life and employee satisfaction. TQM efforts bring out significant changes in these variables. The major indicators of the above three variables were identified and finally an instrument was developed for assessing the human resource quality. The following flow chart clearly illustrates the various steps adopted by the investigator for developing the instrument for assessing human resource quality. It is also evident from the flow chart that having developed the instrument the researcher has tested its reliability. Factor analysis has also been done to verify whether number of statements in respect of each indicator can be further reduced.
Fig 5.1  
Procedural steps

Objective - To develop an instrument for assessing HRQ

Literature survey

TOM  ISO  HRM

Linkage with HRQ

HR measurements and HRQ

HRQ variables and indicators

HRQ model

Development of questionnaire for each indicator

Selection of sample units

Administration of questionnaire to ten sample units in two spells

Scrutiny of responses for consistency

Data entry to SPSS10

Testing the instrument

Reliability test  Significance analysis  Factor analysis

Analysis and presentation of data

Conclusion
3.1 The instrument

For TQM to be in place on a continuous basis, an environment of quality in all aspects of organizational life has to be developed. The review of literature reveals that TQM efforts bring about changes in human resource quality. The instrument developed based on the extensive literature survey and expert opinion is schematically represented below. Detailed discussion and relevant research reviews were presented in chapters II, III and IV.
The human resource quality index has been visualized as the combination of Cultural Change Index (CCI), Quality of Work Life Index (QWLI) and Employee Satisfaction Index (ESI). These variables in the additive model of HRQI were studied.
fully and questionnaires/statements to assess the level of each indicator of these variables were developed. The cultural change index (CCI) has five indicators namely Workmanship Value, Management Attitude, Employee Motivation, Ability and Skill Attainment and Cohesive Work Force. Quality of Work Life Index (QWLI) depends on Motivational Programs, Orientation and Training, Communication Effectiveness and Employee Responsibility. Similarly Employee Satisfaction Index can be assessed by the indicators namely Employee Involvement, Attitude towards Change, Grievance Rate, Accident Rate and Defect Rate. Statements/questionnaires were developed for assessing the level of each of the 14 indicators independently and these measures can be combined to arrive at the Human Resource Quality Index. From the literature survey it has been established that implementation of TQM practices bring about changes/improvements in the quality of human resource.

5.3.2 HUMAN RESOURCE QUALITY INDEX

$$HRQI = CCI + QWLI + ESI$$
5.3.3 Evolution of the instrument

The researcher designed and developed the questionnaire manual with the help of extensive literature survey. Questionnaire has been so designed as to assess the changes in each indicator in the model. Having designed the questionnaire pre-testing was done in two organizations. Based on the analysis and comments the statements have been redrafted and reworded. Attempts have also been made to incorporate sufficient statements to fully capture all the human quality related
dimensions affected by the implementation of TQM. The final questionnaire consists of 279 statements as detailed below covering all the variables and indicators of human resource quality. The questionnaire is a unique product and confirms to the statistical requirements (The questionnaire manual is presented in appendix II). A five point Likert rating scale with always almost true (5) to not at all true (1) was used marking the statements. Some of the statements have been deliberately made negative to ensure the consistency in responding.

Distribution of statements in the instrument along with maximum score for each indicator is given in the following tables 5.1 to 5.4.

Table 5.1

Distribution of statements under CCI

<table>
<thead>
<tr>
<th>Variables</th>
<th>WV</th>
<th>MA</th>
<th>EM</th>
<th>ASA</th>
<th>CWF</th>
<th>CCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of statements</td>
<td>27</td>
<td>18</td>
<td>22</td>
<td>17</td>
<td>30</td>
<td>114</td>
</tr>
<tr>
<td>Maximum score</td>
<td>125</td>
<td>75</td>
<td>100</td>
<td>75</td>
<td>125</td>
<td>500</td>
</tr>
</tbody>
</table>

Table 5.2

Distribution of statements under QWIL

<table>
<thead>
<tr>
<th>Variables</th>
<th>MP</th>
<th>OT</th>
<th>CE</th>
<th>ER</th>
<th>QWLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of statements</td>
<td>17</td>
<td>20</td>
<td>22</td>
<td>18</td>
<td>77</td>
</tr>
<tr>
<td>Maximum score</td>
<td>75</td>
<td>100</td>
<td>100</td>
<td>75</td>
<td>350</td>
</tr>
</tbody>
</table>
Table 5.3

Distribution of statements under ESI

<table>
<thead>
<tr>
<th>Variables</th>
<th>EI</th>
<th>AC</th>
<th>GR</th>
<th>AR</th>
<th>DR</th>
<th>ESI</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of statements</td>
<td>28</td>
<td>24</td>
<td>14</td>
<td>11</td>
<td>11</td>
<td>88</td>
</tr>
<tr>
<td>Maximum score</td>
<td>125</td>
<td>100</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>375</td>
</tr>
</tbody>
</table>

Table 5.4

Distribution of statements under HRQI

<table>
<thead>
<tr>
<th>Variables</th>
<th>CCI</th>
<th>QWLI</th>
<th>ESI</th>
<th>HRQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of statements</td>
<td>114</td>
<td>77</td>
<td>88</td>
<td>279</td>
</tr>
<tr>
<td>Maximum score</td>
<td>500</td>
<td>350</td>
<td>375</td>
<td>1225</td>
</tr>
</tbody>
</table>

A close scrutiny of the distribution of statements highlights that there are 279 statements distributed over CCI, QWLI and ESI. The total number of statements under CCI is 114, out of which 14 statements are meant for testing the consistency of the responses. Similarly it can be observed that there are 77 and 88 statements distributed under QWLI and ESI respectively. Here again 7 statements under QWLI and 13 statements under ESI are aimed at testing consistency. As has already been mentioned the statements are scored on Likert scale. The maximum score for CCI is 500, for QWLI 350 and ESI it is 375. The maximum score for HRQI is 1225.

Surveys were conducted in ten organizations (listed in appendix) comprising of public and private sector organizations in Kerala and Tamil Nadu in two spells in September 2002 and October 2003. All the ten organizations have been ISO certified and are in the process of practicing TQM. Visiting each organization and
The respondents in groups, responses to the questionnaires were collected. The respondents were mainly from the supervisory level. The surveys were conducted in two spells with an interval of one year so as to assess the changes/improvement in each indicator.

These organizations were continuously monitored during the intervening period between the two spells of surveys. This was with the objective of identifying factors other than TOM efforts, which would have affected the human resource quality. The performance of these organizations did not show any sudden or drastic variations during the period under observation. The normal rate of fluctuations did exist. The government policies remained stable. The management/leadership of these organizations did not change. There were only some routine interdepartmental transfers, promotions and posting. During the period under observation, there were no strikes or confrontations in these organizations. Further these organizations did not undertake any acquisition, merger or expansion programs during the period of surveys. As such it may be concluded that there were no significant factors or incidents, which could have affected the human resource quality other than TOM practices in these organizations.

A review of TOM efforts undertaken in these organizations during the period of the study is given below.
From the table 5.5 above, it is clear that during the period between the two spells of survey, all the ten organizations have undertaken sufficient activities in the route of TQM. However, the activities undertaken are not uniform. Since the surveys were conducted during the period September 2002 to October 2003 the investigator wanted only to ensure that these organizations are implementing activities aimed at TQM and it was not possible to assess to what extent each organization has traveled ahead in the process of TQM. Certain organizations were at the early stages and others have gone far ahead in the journey of TQM.
4. Questionnaire Validity

The validity of a questionnaire relies first and foremost on reliability. If a questionnaire cannot be shown to be reliable, there is no discussion of validity (www.decpoin.com/validity.html). The instrument developed by the researcher was tested for reliability using SPSS 10 package (Table 7.1, 7.2). Validity is not a characteristic of a particular instrument, attached to it in a way that ensures it will always produce accurate information no matter where it is used. If you want validity, you have to demonstrate validity in your situation, it is not built into the instrument (www.decpoin.com/validity.html). The researcher has administered the instrument in two spells in ten organizations and analyzed the data and established that the instrument developed by him measures what it is intended to. "We say an instrument valid for specific purpose with a specific group of people. Validity is specific to appropriateness of the interpretation we wish to make with the scores". (www.decpoin.com). In present research, the scholar has used the instrument for a specific purpose of assessing HRQ.

5.4.1 Content-Related Evidence (face validity)

Specialists in the content measured by the instrument were asked to judge the appropriateness of the item on the instrument. If the content of an instrument matches an actual job or situation that is being studied, then the instrument has content validity (www.decpoin.com). In the case of content or face validity, the evidence is subjective and logical. The instrument in this research has been developed on the basis of detailed review and analysis of literature and has been subjected to extensive review by experts in the field. The experts have been requested to scrutinize the relevance and content and give suggestions for improvement. They were also requested to suggest modifications if any with regard to coverage, redundancy and consistency. Based on their suggestions the instrument has been modified and the researcher has ensured content/face validity of the instrument.
### 5.4.2 Predicative Validity

If an instrument is prepared to measure some future performance, predicative validity should be investigated ([www.delsiegle.com](http://www.delsiegle.com)). In the present case the instrument is aimed at measuring different attributes of HRQI and it is not intended for any predictive purpose.

### 5.4.3 Concurrent Validity

Concurrent validity compares the scores on an instrument with current performance. The concurrent validity of an instrument can be verified by administering the instrument to two groups those are known to differ on the trait being measured by the instrument. One would have support for concurrent validity, if the scores of the two groups are very different. The instrument under consideration has been administered in ten different organizations and there exist significant differences in the attributes measured. Hence the instrument has concurrent validity.

### 5.5 Reliability

As has already been mentioned, the validity of an instrument lies in first and foremost in its reliability. An instrument is reliable to the extent that whatever it measures, it measures it consistently. There are three major categories of measures for most instruments: test-retest, equivalent form and internal consistency. Each measures consistency a bit differently and a given instrument need not meet the requirements of each ([www.delsiegle.com](http://www.delsiegle.com)). Test-retest measures consistency from one time to the next. Equivalent form measures consistency between two versions of the instrument. Internal consistency measures consistency within the instrument (consistency among the statements). Generally speaking the longer the test instrument is the more reliable it tends to be. For research purposes a minimum reliability of 0.7 is required. A reliability of 0.7 represents indicated 70% in the scores that are produced by the instruments. In the present instrument the researcher has employed the test-retest method and the reliability of the instrument was assessed using SPSS 10 package (Table 7.1, 7.2). The reliability of the instrument in both the
The internal consistency method measures consistency with in the instruments in three different ways a) split half- used for dichotomously scored variable b) Kuder-Richardson formula (K-R 20 and K-R 21) – used when variables are dichotomously scored and c) Cornbach’s alpha. When the items on an instrument are not scored right versus wrong Cornbach’s alpha is used to measure the internal consistency. This is often used with attitude measuring instruments that use the Likert scale. In the present instrument the researcher has calculated Cornbach’s alpha in respect of every attribute of the model during both the spells of survey and presented in table 7.1 and 7.2. The value of Cornbach’s alpha is well above 0.7 and in most cases it is above 0.9. It may be concluded that the instrument is reliable and valid.

Conclusion

The researcher has continuously monitored the quality management efforts undertaken by all the organization in the sample. There have been systematic and continuous activities in all these organizations aiming at enhancing process quality and product quality. This is evident from the review presented in table 5.5. The instrument developed by the investigator has been administered in the sample units in two spells in September 2002 and October 2003. The responses collected in these surveys were entered in to SPSS 10 software. The next chapter presents the details of sample selection, survey details and major results.